Kawai Piano Company

Presents

High Performance Regulation of the Kawai Grand Piano

KAWAI

THE FUTURE OF THE PIANO

1. Action Location
Test strike point, set keyframe guide
Look at keyframe front edge – should be parallel with trimming line at keybed front.
Check overall hammer spacing. View shank alignment over wippens in each section to confirm whether to align shanks or entire action.
Shim or trim stop block if needed.

2. Ease Keys
Remove stack and ease balance holes for a slightly slow drop with no pressure. Too loose is bouncy, less control
Relative tightness depends on humidity. Ease snug when dry, more free when humid.
Adjust front and balance bushings for ~.5mm free play.
Reinstall action stack, paying attention to proper screw tightening sequence.
V End screws first
Rear screws second
Front (angled) screws last
Square and space keys for evenness and level top surface.

3. Bed the Keyframe
V Turn up keyframe bedding screws until they all knock.
Eliminate all knocking at the front rail.
Readjust the bedding screws to eliminate knocking at the balance rail.
Check evenness and pressure by lifting hammer rail and knocking at each bedding screw.

4. Level Keys
Level white keys to 65~66mm from keybed.
Level black keys 12mm above white keys. 12.7 = ½ inch
Refine squaring and spacing as you go.
Technique: Raise keys with 'U' shaped rod, insert split paper punchings using tweezers and capstan wrench

V **5. Space and Travel**
Travel Hammers
Space Hammers to Strings
Use 1mm spacer between action and stop block for correct trichord hammer spacing
Space / Travel Wippens to Knuckles

V **6. Align Backchecks**
Check front to back angle of backcheck.
f Align side to side to match solidly with hammer tail . checking file or dragon skin 80 grit

7. Check Jack Spacing
ABS wippens need very little, but they still must be checked.
Tapping jack works for minor adjustments. Bend pin flushing to fine adjust Jack
Remove wippen and repin jack for large adjustments.

V **8. Rough Regulate Repetition Springs**
This is the first pass
Rise should be quick and lively, but not jerky

deeper after touch – more spring strength due to compression
Kawai like less after touch than Steinway

9. Regulate Jacks to Knuckles
Back edge of jack even with back of knuckle core.
Sight angle is extremely important – pay close attention to how you view the jacks.
Consistency is paramount – very even jack regulation will help everything else be even.

see white stripe on black jack – line up your eye with knuckle core

10. Set Repetition Lever Height
Feel for slight edge of rep lever window.
Moving jack should cause hammer to 'wink,' but jack must return all the way.

Backcheck height
hammer blow
damper lift point

11. Regulate Capstans
Set hammers 46mm from strings.
Technique: Position gauge between hammer and strings on a sample note, look under pinblock and regulate neighboring hammers.
Once samples are set, pull action and regulate for straight hammer line.

12. Set Letoff
Factory specification is 3mm in bass to 1.5mm in treble
Technique: Keep eyes on strings, turn letoff buttons by feel.
Move quickly for evenness
Go back and recheck previously regulated notes to "calibrate" your eyes

set letoff one wire thickness underneath

13. Regulate Drop
Specification:
Hammer falls 1-2 mm below letoff.
Rep lever and jack tender contact at the same time
Lowest limit is when rep lever meets the drop screw at the same time as the jack meets the letoff button
Upper limit is when hammer just barely drops with a very slow letoff

✓ **14. Regulate Key Dip**
Check with dip block, feel aftertouch as you go.
Set black keys by aftertouch
Uneven aftertouch indicates other regulation problems:

- Jack to knuckle
- Rep lever height
- Drop
- Letoff

15. Regulate Backchecks
Test for rubbing on hard blows by rocking the hammer and key
Factory specification is 15mm from string
If tails rub when regulated to 15mm, then look at backcheck angle.

16. Recheck Repetition Springs
Rapid but smooth rise from check
Very even note to note, becoming slightly faster in treble

17. Refine Regulation
Go back and recheck previous steps for accuracy and evenness.
Repetition Lever Height
Capstans
Drop screws

18. Set Damper Lift when hammer is
Lift with the key - 23mm from string
Technique: Use damper tray to regulate lift

- Set samples, check lift point with action in place
- Block the tray up to the sample lever, loosen all damper wire screws
- Adjust capstans in underlevers for even line
- Snug up wire screws
- Touch up alignment

email, request service ~~bulletin~~ bulletin for this procedure

Adjust Lift with the pedal

- Pitman and tray have about 2mm free motion before dampers begin to lift.

19. Damper Upstop
1mm clearance when black key is fully depressed.
For Shigeru Kawai models, check with pedal down also.
Clearance should be almost 0mm when the pedal is down.

20. Damper Pedal
Adjust pedal rod for proper clearance at rest
2mm space at pitman.
Adjust trap lever stop capstan so that pedal lifts the dampers the same as with the key, or slightly less.

21. Sostenuto Regulation
Adjust pedal rod so that tongue is at about 5:00 if viewed from the treble end.
In and out position of tongue = .5 mm away from tabs.
Height set so that tongue = 0~.5 mm above the tabs.
Set pedal travel so that dampers are held the same height as with the key.

22. Una Corda Pedal
Adjust pedal rod for no lost motion, slight tension against the action
Adjust stop screw so that hammers clear left string
Check tone with pedal down, especially in mid treble.
Use mute in strings to confirm left string is not sounding.

23. Damper Function
Check slow release of pedal after playing a loud chord.
Play each note Staccato, listen for even damping.
Adjust damper wire bending, head alignment as needed.
Trim felt if needed.

Buy expensive scissors at a cutlery shop or barber supply ($200) dont use on paper

Part 2:
Performance Tweaks
Secrets for Maximum Performance

Goals of Regulation

1. Control
   Evenness
2. Power
   Efficiency

Dynamic Range

3. Reliability
   Repetition

high speed

Chart 1:

Ideal Power Output

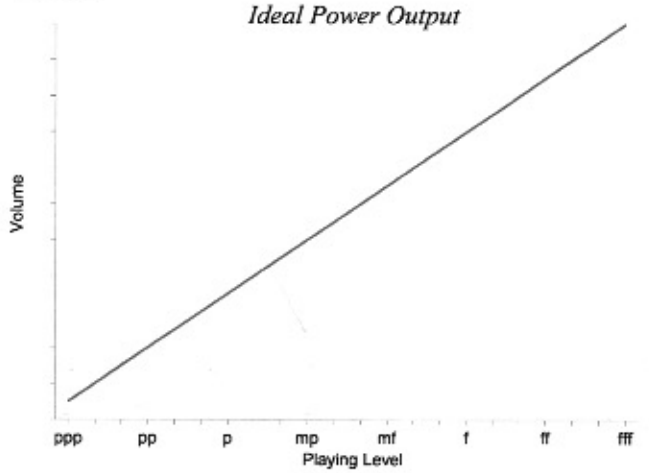


Chart 2: (Too Much)

Letoff Too Great

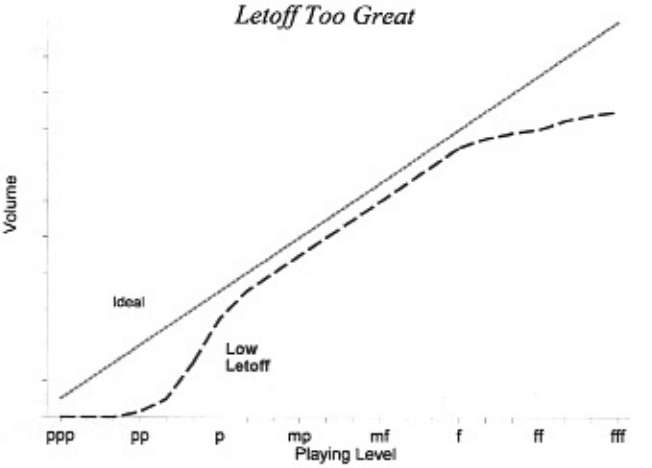


Chart 3:

Backchecks Regulated Too High

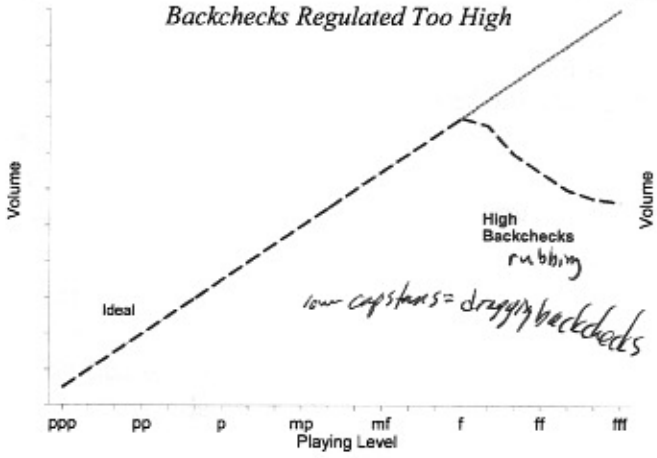
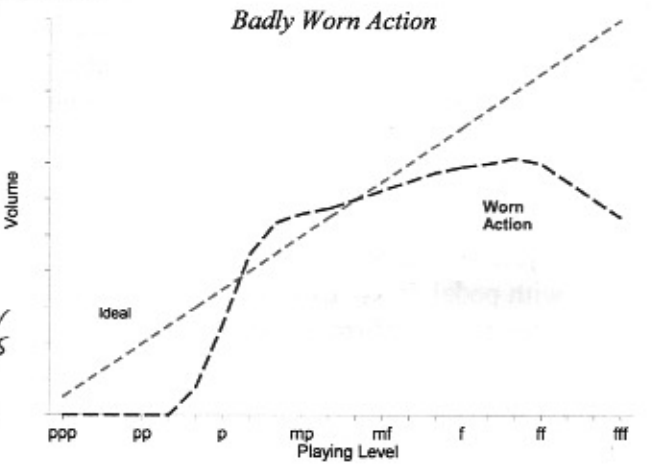


Chart 4:

Badly Worn Action



Action problem = reduced dynamic range or reliability (repetition)

Letoff
Close letoff is a key to control and tone.
Minimum is string thickness, but this is not safe for everyday use.
1.5 in treble, 3mm in bass is safer,
Very close gives the best sustain, and the sweetest sound.
Very close also allows the pianist maximum control over the tone.

Drop
Drop regulation and jack/knuckle regulation are closely related.
High drop (~1mm drop) provides clean, clear tone with good sustain
Must still be regulated below letoff point
.5mm initial drop in a well regulated concert instrument sounds and feels nice
1mm is more safe, and still sounds good.
2mm is very safe, but gives poorer tone.

Repetition Spring
Remember the function of the spring is to push the key back up, not lift the hammer.
The result is that the jack resets as quickly as possible.
Rise should be fast in actions where the hammers are old and light
Also when weather is dry, or if action centers are loose.

Backcheck
Backcheck height and angle are critical.
If checking is too high, there is extra noise, and the action will 'fight back' at the pianist.
In some actions, checking in 'ff' playing can occur before the key hits bottom solidly – this feels terrible!
Otherwise, high checking is good for repetition – so each action can be experimented with to some degree.

Jack to Knuckle
This has a huge affect on the feel of the aftertouch.
This is felt during soft playing especially, affecting how controllable the action is.
Very closely related to drop regulation.
The tone is clearest and sustains the best with the jack under the knuckle the minimum.
Power is best when jack is underneath more.

Repetition Lever
Kawai Grand actions should have no lost motion at all.
First regulation is always done by feel, but it can then be refined by moving the jack.
This requires that the springs be very well regulated first.
In the Carbon action, the jack should be less recessed than in the others.
In the standard ABS, it should be recessed the most.

Key Easing
Balance Hole affects Repetition and Tone, as does overall key friction
Balance bushings affect evenness of touch
Front bushings affect smoothness, control
Bushings can be very carefully tweaked for the most demanding situations:

- Needle through the felt, parallel to the mortice, for slight tightening
- Squeeze with easing tool at an angle for up or down free play – side play should be the same in the up and down positions.

Tips on Older Kawai Actions

Heavy Touch
Knuckles
Check for loose knuckle skin.
Makes touch very heavy.
Either replace knuckles, or tighten skin
Key Pins
Key friction is often very high when bushings are loose
If not badly worn, bushings can be needled
Once bushings are OK, polish and coat pins with Teflon

spray Teflon on the pins

Wippen Auxiliary Springs
Number models, 'C' series had wippen springs.
Often these do not need adjusting – once action is put back in good shape, the springs are working well.
Never start by adjusting these springs – they should only be evaluated after the action is reconditioned and regulated.

Remember
These actions were very well liked when they were new – they were not viewed as heavy actions.
Touch deteriorates with wear more than current Kawai actions.
Returning everything to new specifications will return performance to new.

Performance Checks

Repetition
Friction in action centers
Friction in Keys
Backcheck regulation – height, angle
Knuckles
Repetition Springs
Hammer tail Shape or Surface Texture

Weak Tone
Keyframe Bedding
Blow too much or too little
Backchecks dragging
Letoff too low
Drop too low
Repetition levers too high over jacks
Loose / spongy hammer shanks center bushings

Difficult to Play Softly
Knuckles Flat and Worn, or need lubrication (Teflon powder)
Key friction high
Letoff too low
Drop to low
Jacks too far under knuckles
Repetition springs too strong

Heavy Touch
Worn Knuckles
Loose knuckle skin
Worn key bushings
Damper lift too early
Sharps regulated too high
Backchecks regulated too high
Hammer blow too great

Noise on Impact
Keyframe bedding, especially front rail
Backchecks set too high
Hammer tails very rough

Noise on Release
Knuckles hard
Wippen Cushion
Hammer rail
Keyframe bedding – balance and back

Tone does not Sing
Letoff too low
Drop too low
Jacks too far under knuckles
Aftertouch too much
Hammer shape and voicing
Hammer shank centers too tight

Tone Harsh and Bright
Hammer shape and felt condition (inflexible)
Knuckles flat and worn
Letoff too close
Hammer shank friction too low
Hammer shank too stiff

Concluding Comments
- Action Regulation is not only about touch –
  - it is also about tone!
- Factory specifications are the starting point for fine regulation.
- One must use good regulating technique and apply the specs very consistently.
- Departures from specs can only be based on experience, not formulas.

Mendelssohn!

Kawai